

2007-2008 Highlights

- Outreach products and web pages for Jason-2/OSTM
- Continued highlights of societal benefits
- New applications videos on Aviso
- New Aviso web site (see dedicated presentation)
- New OSTM/Jason-2 web pages on NASA OST site
- 2008 wall calendar (2009 soon!)
- "Climate Day 2008" Multi-partner education event
- OST & Satellite pages in the Wikipedia
- Exhibition on Ocean in Paris (Trocadéro), organized by CNRS

Wikipedia

Ocean surface topography - Wikipedia, the free encyclopedia - Windows Internet Explorer

http://en.wikipedia.org/wiki/Ocean_surface_topography

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Ocean surface topography

From Wikipedia, the free encyclopedia

The ocean surface has highs and lows, similar to the hills and valleys of Earth's land surface depicted on a topographic map. These variations, called "ocean surface topography" or "dynamic sea surface topography" are mapped using measurements of sea surface height relative to Earth's geoid. Earth's geoid is a calculated surface of equal gravitational potential energy and represents the shape the sea surface would be if the ocean were not in motion.

The height variations of ocean surface topography can be as much as two meters and are influenced by ocean circulation, ocean temperature, and salinity.

Ocean surface topography is used to map ocean currents, which move around the oceans "hills" and "valleys" in predictable ways. A clockwise sense of rotation is found around "hills" in the northern hemisphere and "valleys" in the southern hemisphere. This is because of the Coriolis effect. Conversely, a counterclockwise sense of rotation is found around "valleys" in the northern hemisphere and "hills" in the southern hemisphere.^[1]

Ocean surface topography is also used to understand how the ocean moves heat around the globe, a critical component of Earth's climate, and for monitoring changes in global sea level.

TOPEX/Poseidon was the first space mission that allowed scientists to map ocean topography with sufficient accuracy to study the large-scale current systems of the world's ocean. Although this image was constructed from only 10 days of TOPEX/Poseidon data (October 3 to October 12, 1992), it reveals most of the current systems that have been identified by shipboard observations collected over the last 100 years.

Ocean Surface Topography

Jason 1 - Wikipedia, the free encyclopedia - Windows Internet Explorer

http://en.wikipedia.org/wiki/Jason-1

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Jason 1

From Wikipedia, the free encyclopedia (Redirected to Jason-1)

Jason-1^[1] is a satellite oceanography mission to monitor global ocean circulation, study the ties between the ocean and the atmosphere, improve global climate forecasts and predictions, and monitor events such as El Niño and ocean eddies. It is the successor to the TOPEX/Poseidon mission, which measured ocean surface topography from 1992 through 2005. Like its predecessor, Jason-1 is a joint project between the NASA (United States) and CNES (France) space agencies. Jason-1's successor, the Ocean Surface Topography Mission^[2] on the Jason-2 satellite, was launched in June 2008. These satellites provide a unique global view of the oceans that is impossible to acquire using traditional ship-based sampling.

Jason-1 was designed to measure climate change through very precise millimeter-per-year measurements of global sea level changes. As did TOPEX/Poseidon, Jason-1 uses an altimeter to measure the hills and valleys of the ocean's surface. These measurements of sea surface topography allow scientists to calculate the speed and direction of ocean currents and monitor global ocean circulation. The global ocean is Earth's primary storehouse of solar energy; Jason-1's measurements of sea surface height reveal where this heat is stored, how it moves around Earth by ocean currents, and how these processes affect weather and climate.

Jason-1 was launched on December 7, 2001 from California's Vandenberg Air Force Base, aboard a Boeing Delta II. During the first months Jason-1 shared an almost identical orbit to TOPEX/Poseidon, which allowed for cross calibration. At the end of this period, the older satellite was moved to a new orbit midway between each Jason ground track. Jason has a repeat cycle of 10 days.

The program is named after the Greek mythological hero Jason.

Jason-1

Ocean Surface Topography Mission - Wikipedia, the free encyclopedia - Windows Internet Explorer

http://en.wikipedia.org/wiki/OSTM

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Ocean Surface Topography Mission

From Wikipedia, the free encyclopedia (Redirected to OSTM)

This article or section documents a current or recent spaceflight. [Click here to change as the mission progresses.](#)

The Ocean Surface Topography Mission (OSTM) on the Jason-2 satellite^[1] is an international Earth observation satellite mission that continues the sea surface height measurements begun in 1992 by the joint NASA/CNES TOPEX/Poseidon mission^[2] now being made by the NASA/CNES Jason-1 mission launched in 2001.^[3]

Like its two predecessors, OSTM/Jason-2 uses high-precision ocean altimetry to measure the distance between the satellite and the ocean surface to within a few centimeters. These very accurate observations of variations in sea surface height—also known as ocean topography—provide information about global sea level, the speed and direction of ocean currents, and heat stored in the ocean.

Scientists consider the 15-plus-year climate data record that this mission will extend critical understanding of how ocean circulation is linked to global climate change.

OSTM/Jason-2 was launched at 07:45 UTC on June 20, 2008, from Space Launch Complex 2W at the Vandenberg Air Force Base in California, USA, by a Delta II 7320 rocket.^[4] The spacecraft separated from the rocket 55 minutes later.^[5]

It is now in a 1,336 km (830 mi) circular, non-sun-synchronous orbit at an inclination of 66 degrees to Earth's equator, allowing it to monitor 95 percent of Earth's ice-free ocean every 10 days.

OSTM/Jason-2 is flying in line with Jason-1 (approximately 50 seconds or 300 miles behind) while scientists compare the operation and accuracy of both satellites' instruments and data products. Once this cross-calibration and validation is complete, Jason-1 will be moved to a parallel position, in mode, doubling the amount of ocean data collected as the transition from research into operational mode. The mission then moves from the space agencies to the world's which use them for short-range, seasonal, and long-range

OSTM/Jason-2

Accordion-folded flyer

- A flyer on altimetry & applications
- Available in English, French or Spanish

Altimétrie

1990, 1993, 1995, 2000, 2005, 2008, 2010, 2012, 2015, 2018, 2020

1990, 1993, 1995, 2000, 2005, 2008, 2010, 2012, 2015, 2018, 2020

Doris

1990, 1993, 1995, 2000, 2005, 2008, 2010, 2012, 2015, 2018, 2020

Mercator, l'océan en prévisions

1990, 1993, 1995, 2000, 2005, 2008, 2010, 2012, 2015, 2018, 2020

Un océan d'applications

1990, 1993, 1995, 2000, 2005, 2008, 2010, 2012, 2015, 2018, 2020

Recherche

1990, 1993, 1995, 2000, 2005, 2008, 2010, 2012, 2015, 2018, 2020

Le niveau monte

1990, 1993, 1995, 2000, 2005, 2008, 2010, 2012, 2015, 2018, 2020

Climat, le dialogue de l'air et de l'eau

1990, 1993, 1995, 2000, 2005, 2008, 2010, 2012, 2015, 2018, 2020

Vents et vagues

1990, 1993, 1995, 2000, 2005, 2008, 2010, 2012, 2015, 2018, 2020

Environnement et sécurité en mer

1990, 1993, 1995, 2000, 2005, 2008, 2010, 2012, 2015, 2018, 2020

Cyclones

1990, 1993, 1995, 2000, 2005, 2008, 2010, 2012, 2015, 2018, 2020

Biologie et courants

1990, 1993, 1995, 2000, 2005, 2008, 2010, 2012, 2015, 2018, 2020

Lacs, fleuves et mers fermées

1990, 1993, 1995, 2000, 2005, 2008, 2010, 2012, 2015, 2018, 2020

Plus près des côtes

1990, 1993, 1995, 2000, 2005, 2008, 2010, 2012, 2015, 2018, 2020

AVISO / ALTIMETRIE
www.aviso.fr

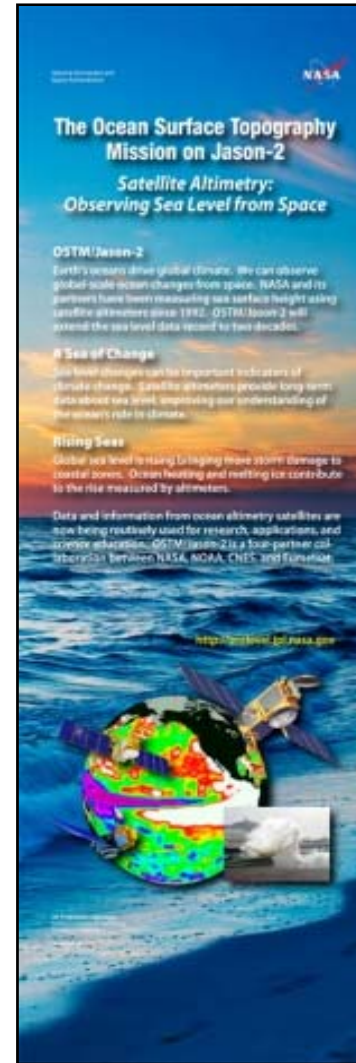
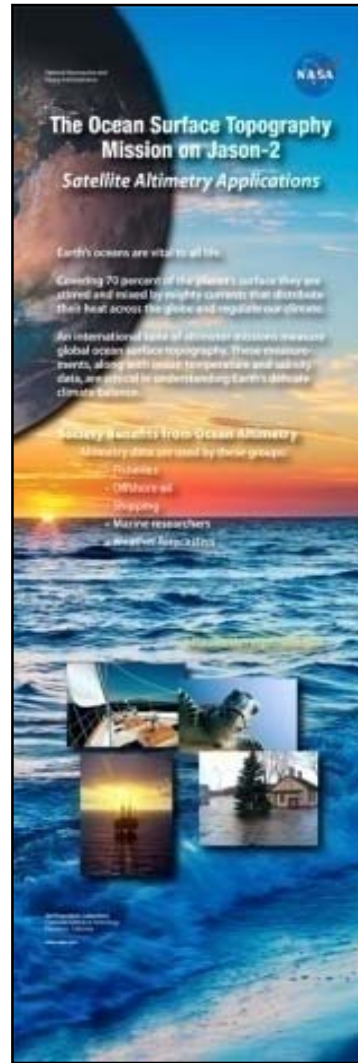
cnes
Centre National d'études Spatiales
12 avenue Edouard Belin - 31027 Toulouse Cedex 4
www.cnes.fr

La surveillance des océans par altimétrie

Le plus, les océans sont surveillés par altimétrie... La surveillance des océans par altimétrie...

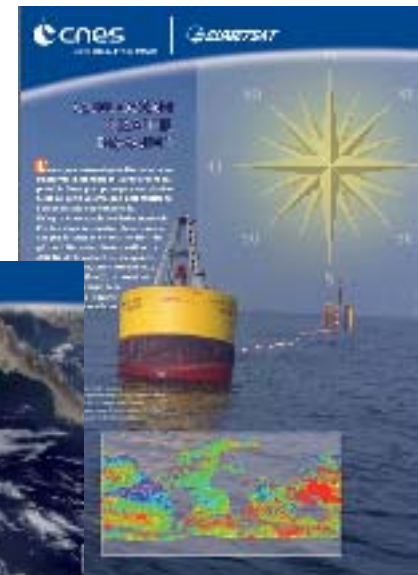
OSTM/Jason-2 Multi-purpose exhibit

- Exhibits that can be used in different venues
- 3 separate panels, stand-alone or use together
- Applications
 - Education
 - General mission



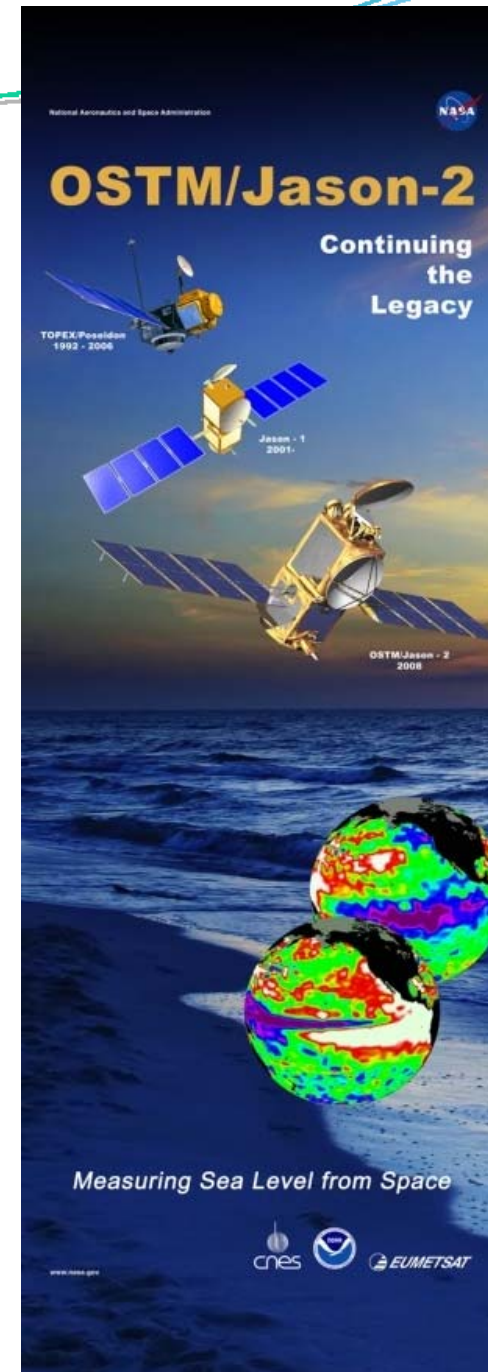
Series of posters

- Series of applications, altimetry, and Doris posters
- Pdfs available in Aviso web site gallery



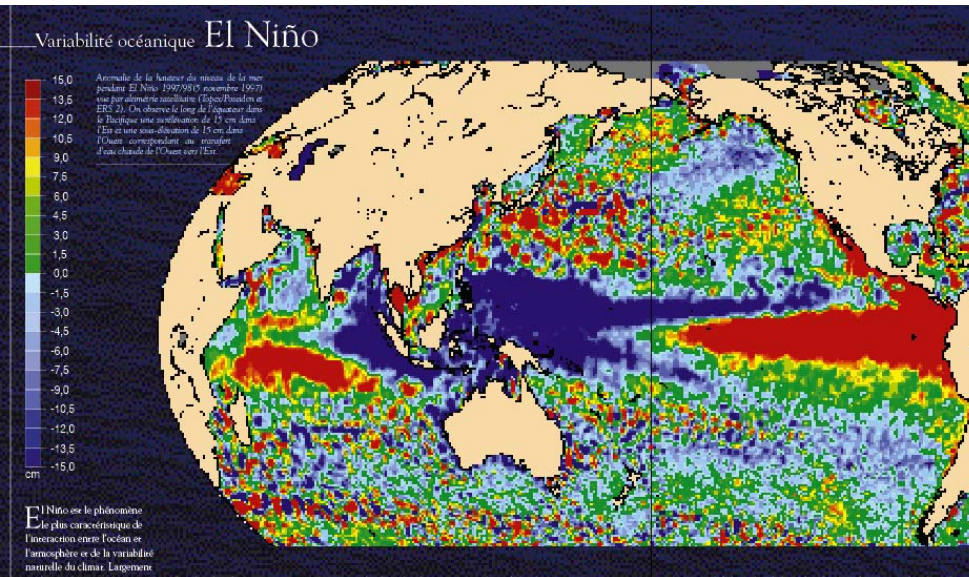
OSTM/Jason-2 banner

- OSTM launch banner displayed at JPL in 6 public locations beginning 2 weeks prior to launch
- Also printed as small poster



Altimetry highlighted in books

- *Satellites*, Cherche-Midi Ed. (A. Chabreuil, Cnes)
- Book on Climate & Earth Observation, Thalès (Club des Argonautes)



de TOPEX-POSEIDON à JASON
Océans sous surveillance

Le 15 mai 2001, après dix ans de collaboration entre le CNRS et le CNES, les deux partenaires de cette aventure spatiale, que le satellite Jason Proba1a, bien sûr, et dans la suite de Jason 2, ont été lancés. Ils ont pour mission de surveiller le niveau de la mer à l'échelle mondiale et de contribuer à la connaissance de la dynamique des océans et de leur interaction avec l'atmosphère et la lithosphère. Ce livre présente les concepts et les technologies qui ont permis la réalisation de ce projet ambitieux. Il est dédié à tous ceux qui ont contribué à sa réussite, et en particulier aux scientifiques et ingénieurs qui ont travaillé sur ce projet.

Thalès, représentant français principal des activités de l'industrie spatiale, a été choisi pour concevoir et développer le satellite Jason Proba1a. Ce satellite est le premier d'une série de satellites Jason qui seront lancés par le CNES et le CNRS. Thalès a également développé le système de données de ce satellite, qui permettra de collecter les données et de les transmettre à la Terre. Ce système est développé par le CNES, qui gère également le système de données de Jason 2. Ce système est développé par le CNES, qui gère également le système de données de Jason 2.

Aviso (new) Newsletter

- Two issues of a new format of Aviso Newsletter.
- Pdf, sent by e-mail / available on the web

Project News
N. Fiori (CNES)
 This is the first issue of the entirely new Aviso Newsletter. Distributed electronically, and dedicated to meeting the needs of data users, this newsletter highlights CNES altimetry-mission activities over the past 6 months. We hope you will share your feedback and expectations with us, to enable us to continue improving this newsletter. We plan to provide regular information on projects (satellites, as well as data processing and re-processing, current and future), validation, data use examples, outreach information, and a list of events on the agenda.

Level
 Data from Jason-1, Envisat and GFO continue to be routinely processed on the CNES side to generate GRDs and higher level products.
 2007 was marked by several incidents affecting data coverage and the quality of near real time level 3 data. The main problem was on the GFO satellite: due to heavy icing, the payload is now without power whenever the solar panels are not exposed to the sun, leading to an obvious impact on data coverage. On Envisat, several platform and RA2 incidents occurred, leading to data availability falling below 90% (including January 2008). In early 2008 (on 17 January 2008, 25/26 and 1/20), transmission powers for the Envisat S-band altimeter suddenly dropped. Consequently all S-band parameters, as well as the dual frequency correction have now become irrelevant and cannot be used from the data onwards. As for its predecessors (Topex/Poseidon and

Level
 that indication that the wet tropospheric correction is an important source of uncertainty in computing MSS trends.
 In order reference frame is also important the global error budget. Several studies are shown that the current TTP (TRIP97 of TRIP2000) and Jason-1 (TRIP2000) altimetry reference frames induce, in particular, significant differences between the stations and the Northern hemisphere are the "Three orbit determination and self-positioning" that were displayed in the last STSRT altimetry. TRIP2005 is a new reference frame which uses a new geometry added derived from Grace data. Differences between this new reference frame and the older one amount to between 0.1 and 2 mm/yr. The use of TRIP2005 should improve the accuracy of the data when it is implemented. The products being distributed now have not yet been updated, however, history data need to be corrected for altimetry in its surface height due to atmospheric pressure variations (atmospheric

News of OSTM/Jason-2
J. Proton, Jason-2 project manager at CNES
 This is a special feature issue of the Aviso users Newsletter, dedicated to the newborn Jason-2 mission. Less than one month after launch, all indicators are very good. The satellite is now beginning its standard verification phase, 55 seconds behind Jason-1.

OSTM/Jason-2 was successfully launched on 20 June 2008, after a slight delay of four days with respect to the initial date planned about four years ago. The launch sequence went off normally and the Delta II rocket put Jason-2 onto the right injection orbit. All equipment on the satellite platform opened perfectly.
 DORIS was the first instrument to be switched on, during the evening of June 20. In spite of the satellite being in "hardware" mode (ie. spinning with its different sides alternately exposed to the Sun), which is not favorable for DORIS in the antenna then only in- orbit ground based signals intermittently. The DORIS onboard navigation achieved inaccurate accuracy on the satellite position in less than six hours.
 The spacecraft began functioning anomalously in parallel with geometric (astid) pointing on the morning of June 21. The other instruments were successfully activated on June 22, namely Poseidon (altimetry), CNES, AIRS (atmosphere), NASA's GPS receiver.
 The Delta II rocket with Jason-2 inside it is

Level
 to be observed on two occasions in the Jason-2 pressure fields (derived from ECMWF Gaussian grids).
 Flattening single MSS from Topex/Poseidon and Jason-1 in half century uncertainties. Three altimeters (Topex A, Topex B, Poseidon-2) took turns in measuring sea surface heights. In order to connect them correctly, SSH biases have to be applied (Topex A / Topex B = 5 mm +/- 2 mm, Topex B / Poseidon-2 = 75 mm +/- 1 mm). However the uncertainty associated with each SSH bias is significant enough to impact the global

the GPS, N station and CNES and I ANSA (both to snow tasks) of Jason-1. For the opening of an operating location pressure ground cable.
 The TLE (T passage) use sea remote of precision.
 An analysis in it functions echoes now. The Observat se, France) is later on Jason leonary copy of the first. The satellite is 2008 at as a series of information will it on the same being newly. The Jason-1

Events
 End of July 2008: distribution of first Jason-2 OGDRE and IODR data to PS
 September 8-12, 2008: Eurostat meeting (Darmstadt, Germany)
 September 10, 2008: GOCE launch
 October 2008: Installation of first Jason-2 GDR data to PS
 November 2008: end of Jason-2 Calval phase for OGDRE
 November 6-7, 2008: Second Coastal Altimetry Workshop (Pisa, Italy)
 November 10-12, 2008: OSTY meeting (Nice, France)
 November 12-15, 2008: Final GODAE symposium (Nice, France)
 November 12-15, 2008: IDS workshop (Nice, France)
 Following: New OSTY first Jason-2 OGDRE data distribution to users
 March 2009: end of Jason-2 Calval phase for IODRE
 March 2009: OSTY meeting (Le Diego, USA)
 Following: San Diego OSTY first Jason-2 IODRE data distribution to users
 Aviso users newsletter

Level
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 Aviso users newsletter

- Another issue to be published soon

Jason-2 contest for schools

- “Un canard sur l’océan” a contest for schools to write, lay-out and publish their own newspaper on satellites and climate
- Ressources on the web, including a Desktop-publishing software



CONCOURS
UN CANARD
SUR L'OCEAN

EDITION SPECIALE
Satellites et climat

20 juin 2008
le satellite **JASON-2** est mis en orbite.
Objectif : observer les océans pour comprendre la machine climatique.

1er septembre 2008
le CNES lance un **concours** auprès des jeunes.
Objectif : les sensibiliser à l'utilisation des satellites pour l'étude du climat.

Pour participer au concours
fais ton journal!
connecte-toi sur le site :
www.concourssatellitejason2.com

A GAGNER

- 3 stations météo
- 3 lunettes astronomiques
- 6 ordinateurs portables

ainsi que des récompenses pour toutes les classes participantes.

6 prix : Prix école primaire, prix collèges, prix lycées, prix "coup de cœur du jury", prix du "journal hors France", prix du journal individuel.

En classe ou en individuel, le CNES t'invite à participer au concours "Un canard sur l'océan - Édition spéciale : satellites et climat". C'est toi le rédacteur en chef... mène l'enquête, écris, photographie, dessine et mets en page ton journal !

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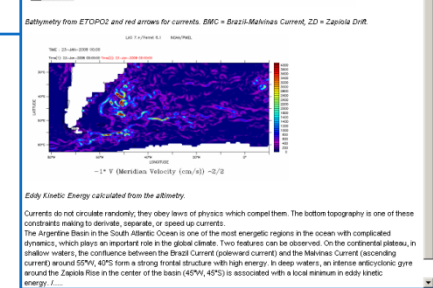
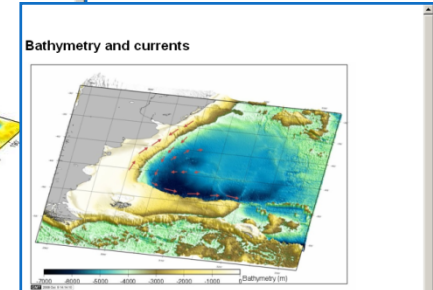
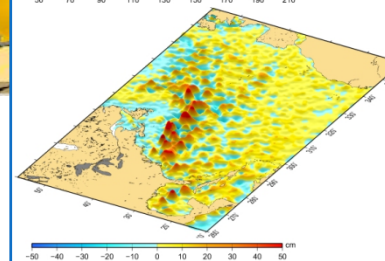
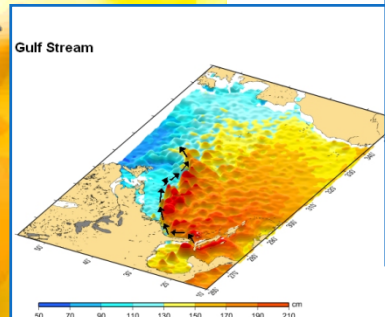
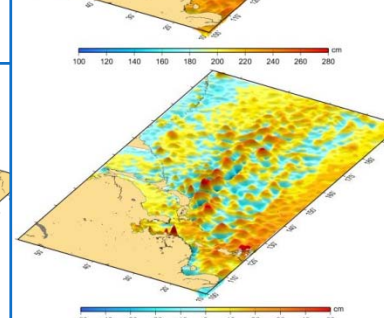
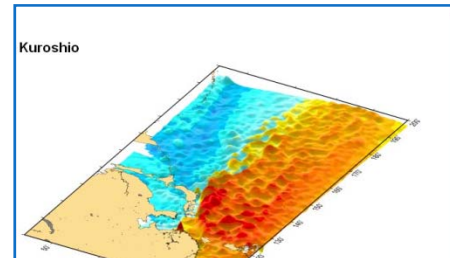
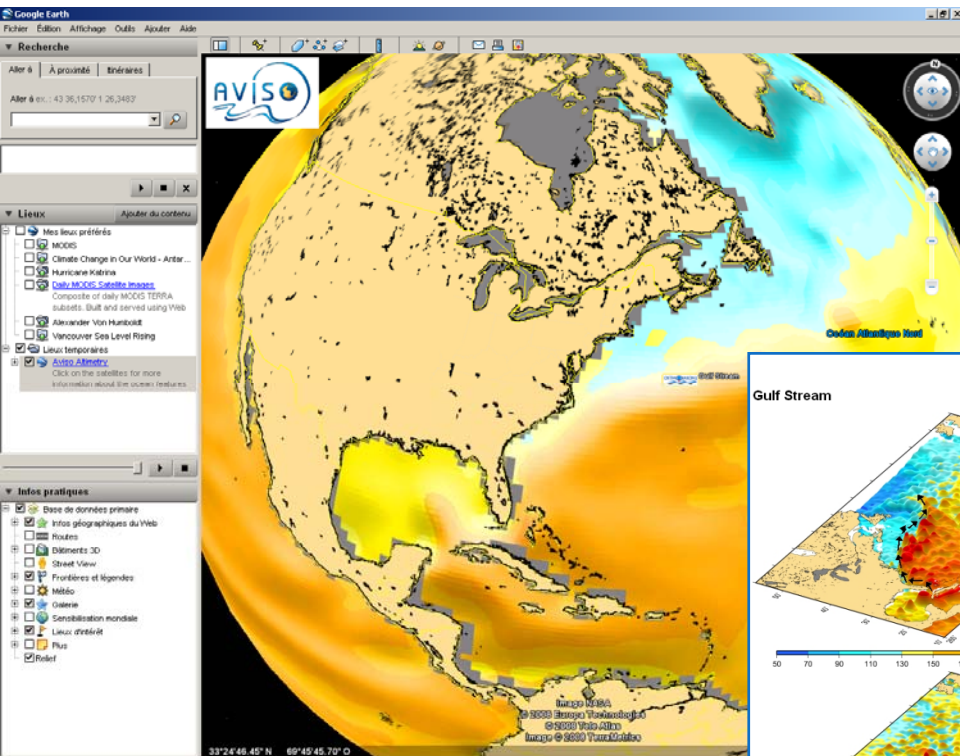
New Planned Efforts

- Jason-2/OSTM Education & Public Outreach & applications outreach
- Saral & SWOT Education & Public Outreach & applications outreach
- Highlight altimetry applications, including multisensor
- Coverage of science team research and other applications on web
- “Climate Day 2009” Multi-agency, multi-partner education and public outreach event
- Argonautica 2008-2009 begins soon
- Radar altimetry tutorial and toolbox new version (<http://www.altimetry.info>)
- Google Earth altimetry application browser in preparation, with a series of new images



Browsing altimetry applications through Google Earth

- Using Google Earth to display images of altimetry applications



Eddy Kinetic Energy calculated from the altimetry.
 Currents do not circulate randomly, they obey laws of physics which compete them. The bottom topography is one of these constraints making to deviate, separate, or speed up currents. The Argentine Basin in the South Atlantic Ocean is one of the most energetic regions in the ocean with complicated dynamics, which plays an important role in the global climate. Two features can be observed. On the continental plateau, in shallow waters, the confluence between the Brazil Current (poleward current) and the Malhines Current (according current) around 50°W, 40°S forms a strong tracer structure with high energy. In deep waters, an intense anticyclonic gyre around the Zapiola Rise in the center of the basin (45°W, 45°S) is associated with a local maximum in eddy kinetic energy. [...]

Outreach session agenda

- 11:00-11:05* Welcome & Introduction,
V. Rosmorduc, M. Srinivasan
- 11:05-11:20* Argonautica: king penguins tracking
(students presentation)
- 11:20-11:30* NASA's OST Web Site: Promoting OST Research
M. Srinivasan
- 11:30-10:40* Ocean & Climate Literacy: JPL Outreach Update
A. Richardson
- 11:40-11:55* A New Aviso Web Site
V. Rosmorduc
- 11:55-12:05* India/CNES Altimetry Training Program,
A. Lombard, E. Thouvenot
- 12:05-12:25* Outreach Showcase of OSTST products and activities
- 12:30* Wrap Up